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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,348	01/21/2004	Anand D. Sankruthi	200315686-1	9775

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HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

DARE, RYAN A

ART UNIT PAPER NUMBER

2186

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/760,348	SANKRUTHI, ANAND D.	
	Examiner	Art Unit	
	Ryan Dare	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01/21/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☒ Claim(s) 2 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01/21/06 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "10" has been used to designate both "START" and "Get the symbolic name of the volume".
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "14" has been used to designate five separate "END" logical blocks.
3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

1. Claims 2 and 12 are objected to because of the following informalities.
Appropriate correction is required.

2. Claim 2 recites: "the storage device comprise...". The Examiner believes this should be changed to: "the storage device comprises..."
3. Claim 12 recites "determining if the all storage unit extents...". The Examiner believes this should be changed to: "determining if all storage unit extents..."
4. It is the duty of Applicant to examine all claims and identify minor grammatical errors such as those listed above.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claims 3, 5-8 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claim 3 recites the limitation "the data storage unit" in line 1. There is insufficient antecedent basis for this limitation in the claim. It is unclear which data storage unit claim 3 is referring to, as claim 2 recites "one or more data storage units."
4. Claim 5 recites the limitation "the symbolic names of each volume" in lines 2 and 3. There is insufficient antecedent basis for this limitation in the claim. Claim 1 does not claim a plurality of volumes with symbolic names.
5. Claim 6 recites the limitation "the volumes" in line 2. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 7 recites the limitation "the volumes" in line 2. There is insufficient antecedent basis for this limitation in the claim.
7. Claim 8 recites the limitation "the symbolic volume name" in line 2. There is insufficient antecedent basis for this limitation in the claim.
8. Claim 12 recites the limitation "the symbolic name" in line 3. There is insufficient antecedent basis for this limitation in the claim.
9. Claim 12 recites the limitation "the volume" in lines 3, 6, 7, and 9. There is insufficient antecedent basis for this limitation in the claim.
10. It is the duty of Applicant to examine all claims and identify problems such as those listed above to ensure that all claims comply with 35 U.S.C. 112, second paragraph.

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claim 16 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 16 recites: "**A module adapted to function in accordance with claim 1,**" wherein claim 1 is a method. It is unclear to the Examiner as to which of the four statutory classes of invention claim 16 resides in (process, machine, manufacture, or composition of matter). A module that is adapted to perform a method can be reasonably interpreted to be a piece of software code. Software code, absent a tangible embodiment on a computer storage medium is non-

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statutory. As a result, it is the Examiner's position that claim 16 is directed to a non-statutory subject matter.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-6, 8, 13, and 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Black, US Patent 6,813,686.

5. With respect to claim 1, Black teaches a method of determining volume types present on a storage device, the method including the steps of determining superficial specifying characteristics of an unknown volume on the storage device and correlating these against one or more previously determined volume characteristics thereby inferring the volume type, in col. 9, lines 35-46 and 53-58. The superficial specifying characteristic of Black's invention is the volume identifier.

6. With respect to claim 2, Black teaches a method as claimed in claim 1, wherein the storage device comprises one or more data storage units, in col. 9, lines 37-39.

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7. With respect to claim 3, Black teaches a method as claimed in claim 2, wherein the data storage unit corresponds to a disk or drive and/or is logical or physical, in col. 2, lines 3-6.

8. With respect to claim 4, Black teaches a method as claimed in claim 3, wherein the storage device comprises a disk, array of disks or similar assembly of partitionable media, in col. 5, lines 34-35.

9. With respect to claim 5, Black teaches a method as claimed in claim 1, wherein the specifying characteristics include identifying strings embedded in the symbolic names of each volume, in col. 24, lines 22-30, which describes the description field of the ELVID (logical volume identifier).

10. With respect to claim 6, Black teaches a method as claimed in claim 1, wherein the specifying characteristics further include characteristics related to how the volumes are physically arranged in the storage device, in col. 9, lines 42-46.

11. With respect to claim 8, Black teaches a method as claimed in claim 1, wherein RAID and striped volume types are identified by corresponding strings present in the symbolic volume name, in col. 9, lines 39-46, which describe the identifier. Also, see col. 5, line 43 through col. 6, line 44, which describe some of the RAID types used in by Black. Note that the logical volume types listed by Black in col. 9, lines 39-46 correspond to the RAID types. Therefore, Black teaches this limitation.

12. With respect to claim 13, Black teaches a system for managing volumes on storage devices including:

- memory which stores specifying characteristics corresponding to one or more volume types, in col. 18, line 66 through col. 19, line 13;
- a processor arranged to determine characteristics of volumes occupying storage devices which are present on the system and correlate the determined characteristics against the specified characteristics thereby inferring the volume type, col. 9, lines 35-46 and 53-58.

13. With respect to claim 15, Black teaches a computer adapted to operate in accordance with claim 1, in fig. 10, host computer 110.

14. With respect to claim 16, Black teaches a module adapted to function in accordance with claim 1, in fig. 10, storage management application 114.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

17. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Black as applied to claims 1-6, 8, 13, and 15-16 above, further in view of Kim et al., US PGPub 2003/0023811.

18. With respect to claim 7, Black teaches all other limitations of the parent claims as discussed supra, but fails to mention storage unit extents. Kim et al. teach a method, wherein the physical arrangement of the volumes on the storage device include criteria corresponding to the size of the storage unit extents of the volume in relation to the actual size of the volume, in fig. 5, Extent Size 95 and Total Number of Extents in Volume 96.

19. It would have been obvious to one of ordinary skill in the art at the time the invention was made, having the teachings of Black and Kim et al., to modify the logical volume management system of Black with the logical volume management system of Kim et al. so that operations on the storage device can be controlled quickly and easily in software by a logical volume manager, thereby allowing increased flexibility and speed, as taught by Kim et al. in pars. 30-33

20. With respect to claim 8, Black teaches all other limitations of the parent claims as discussed supra. The Examiner also believes Black teaches all limitations of claim 8. However, if Black were not teach that the RAID information was stored in the logical volume identifier, Kim et al. teach this limitation. With reference to fig. 5, Kim teaches a method, wherein RAID and striped volume types are identified by corresponding strings present in the symbolic volume name, in RAID Level 98.

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21. It would have been obvious to one of ordinary skill in the art at the time the invention was made, having the teachings of Black and Kim et al., to modify the logical volume management system of Black with the logical volume management system of Kim et al. so that operations on the storage device can be controlled quickly and easily in software by a logical volume manager, thereby allowing increased flexibility and speed, as taught by Kim et al. in pars. 30-33.

22. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Black as applied to claims 1-6, 8, 13, and 15-16 above, further in view of Mason, Jr. et al., US Patent 6,611,896.

23. With respect to claim 9, Black teaches all other limitations of the parent claim but fails to teach that a mirrored volume type is indicated when the extents of a logical volume are greater than the actual size of the volume. Mason, Jr. et al. teaches that when data is mirrored between two physical devices, the extents of the volume will be greater than the actual size of the volume, in col. 4, lines 42-57, thereby teaching:

a method as claimed in claim 1 wherein, if the volume is not previously identified as a RAID volume, the characteristic of the sum of the storage unit extents occupied by the volume being greater than the actual size of the volume corresponds to a mirrored volume type.

24. It would have been obvious to one of ordinary skill in the art at the time the invention was made, having the teachings of Black and Mason, Jr. et al. before him at the time the invention was made, to modify the logical volume management system of

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Black with the logical volume management system of Mason, Jr. et al., in order to identify mirrored volumes, thereby allowing optimization of seek times to mirrored volumes, as taught by Mason, Jr. et al. in col. 3, lines 5-20.

25. Claims 10-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Black as applied to claims 1-6, 8, 13, and 15-16 above, further in view of Cabrera et al., US Patent 6,553,387.

26. With respect to claim 10, Black teaches all other limitations of the parent claim but fails to expressly teach that a simple volume type corresponds to storage unit extents being on the same storage unit. Cabrera et al. teach a method, wherein the characteristic of the storage unit extents occupied by the volume being on the same storage unit corresponds to a simple volume type, in col. 8, lines 12-14.

27. It would have been obvious to one of ordinary skill in the art, having the teachings of Black and Cabrera et al. before him at the time the invention was made, to modify the logical volume management system of Black with the logical volume management system of Cabrera et al., in order to identify a simple volume, which allows the logical volume manager to determine the sanity of a drive in case of a hardware failure, as taught by Cabrera et al. in col. 3, lines 34-46.

28. With respect to claim 11, Black teaches all other limitations of the parent claim but fails to expressly teach how storage unit extents correspond to a spanned volume type. Cabrera et al. teaches that a spanned volume type corresponds to the case when the sum of the storage unit extents occupied by a volume are greater than the actual

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size of the volume and that the storage unit extents occupied by the volume are not on the same storage device, in col. 8, lines 15-21. Note that the concatenation volume type is a synonym for the spanned volume type. Since Black already taught identification of RAID volume in a previous step, the combination of Black and Cabrera et al. teaches:

A method as claimed in claim 1, wherein if the volume is not previously identified as a RAID volume, the characteristic of neither the sum of the storage unit extents occupied by the volume being greater than the actual size of the volume nor the storage unit extents occupied by the volume being on the same storage device, corresponds to a spanned volume type.

29. It would have been obvious to one of ordinary skill in the art, having the teachings of Black and Cabrera et al. before him at the time the invention was made, to modify the logical volume management system of Black with the logical volume management system of Cabrera et al., in order to identify concatenated (spanned) volume types, which allows the logical volume manager to indicate in the case of a physical disk failure, whether the remaining disk is capable of handling I/O, as taught by Cabrera et al. in col. 3, lines 39-46.

30. With respect to claim 12, Black teaches a method of determining the volume types present on a disk, the method including the steps of:

- determining if the symbolic name of the volume contains information identifying the volume type as either "raid" or "striped" thereby indicating that the volume type is "raid" or "striped" thereby indicating that the

volume type is "raid" or "striped" respectively, in col. 9, lines 35-46 and 53-58. The symbolic name of Black's invention is the volume identifier. Also, see col. 5, line 43 through col. 6, line 44, which describe some of the RAID types used in by Black. Note that the logical volume types listed by Black in col. 9, lines 39-46 correspond to the RAID types. Therefore, Black teaches this limitation.

Cabrera et al. teach:

- determining the size of all the storage unit extents occupied by the volume and the actual size of the volume, in col. 10, lines 13-16;
- determining if the sum of the storage unit extents is greater than the actual size of the volume thereby indicating that the volume type is "mirrored," in col. 8, lines 33-43;
- determining if all storage unit extents lie on the same storage unit thereby indicating that the volume type is "simple," in col. 8, lines 12-14;
- and, determining if all storage unit extents do not lie on the same storage unit and that the sum of the storage unit extents is not greater than the actual size of the volume, thereby indicating that the volume type is "spanned," in col. 8, lines 15-21.

31. It would have been obvious to one of ordinary skill in the art, having the teachings of Black and Cabrera et al. before him at the time the invention was made, to modify the logical volume management system of Black with the logical volume management system of Cabrera et al., in order to identify different types of volumes,

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which allows the logical volume manager to determine the sanity of a drive in case of a hardware failure, as taught by Cabrera et al. in col. 3, lines 34-46.

32. With respect to claim 14, Black teaches all other limitations of the parent claim as discussed supra and further teaches a system as claimed in claim 13, wherein the inference step includes extracting the symbolic name of the volume and if it includes the string RAID or striped, correlating that with the RAID and striped volume types respectively, in col. 9, lines 35-46 and 53-58. The symbolic name of Black's invention is the volume identifier. Also, see col. 5, line 43 through col. 6, line 44, which describe some of the RAID types used in by Black. Note that the logical volume types listed by Black in col. 9, lines 39-46 correspond to the RAID types. Therefore, Black teaches this limitation. Black fails to teach analyzing the size of the storage unit extents to determine the volume type.

Cabrera et al. teach: otherwise analyzing the size of the storage unit extents occupied by the volume and if the sum of the storage unit extents occupied by the volume and if the sum of the storage unit extents is more than the actual size of the volume correlating that with a mirrored volume type, if the storage unit extents occupied by the volume all reside on the same storage unit, correlating that with a simple volume type and if none of the abovementioned criteria are met, correlating this with a spanned volume type, in col. 10, lines 13-16, col. 8, lines 12-21 and 33-43.

33. It would have been obvious to one of ordinary skill in the art, having the teachings of Black and Cabrera et al. before him at the time the invention was made, to modify the logical volume management system of Black with the logical volume

management system of Cabrera et al., in order to identify different types of volumes, which allows the logical volume manager to determine the sanity of a drive in case of a hardware failure, as taught by Cabrera et al. in col. 3, lines 34-46.

Conclusion

34. The prior art made of record on form PTO-892 and not relied upon is considered pertinent to applicant's disclosure. Applicant is required under 37 C.F.R. § 1.111(c) to consider these references fully when responding to this action. The documents cited therein teach similar logical volume management systems

35. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Dare whose telephone number is (571)272-4069. The examiner can normally be reached on Mon-Fri 9:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (571)272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read "Ryan A. Dare". The signature is fluid and cursive, with the first name "Ryan" written in a larger, more prominent script than the last name "Dare".

Ryan A. Dare
February 16, 2006

A handwritten signature in black ink, appearing to read "Matthew D. Anderson". The signature is fluid and cursive, with the first name "Matthew" written in a larger, more prominent script than the last name "Anderson".

MATTHEW D. ANDERSON
PRIMARY EXAMINER